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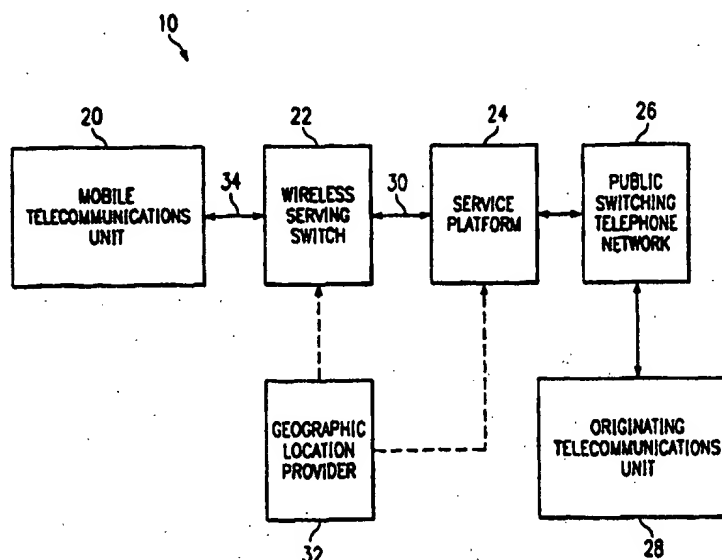


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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US98/11591 (22) International Filing Date: 5 June 1998 (05.06.98) (30) Priority Data: 08/874,061 12 June 1997 (12.06.97) US (71) Applicant: NORTHERN TELECOM LIMITED [CA/CA]; World Trade Center of Montreal, 8th floor, 380 St. Antoine Street West, Montreal, Quebec (CA). (71)(72) Applicants and Inventors: LARKINS, John, Pruet [US/US]; 811 Charter Oak, Allen, TX 75002 (US). STEPHENS, Gary, Boyd [US/US]; 822 Deerlake Drive, Allen, TX 75007 (US). (74) Agents: MCCOMBS, David, L. et al.; Haynes and Boone, L.L.P., 3100 NationsBank Plaza, 901 Main Street, Dallas, TX 75202-3789 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	

(54) Title: SYSTEM AND METHOD FOR PROVIDING A GEOGRAPHIC LOCATION OF A MOBILE TELECOMMUNICATIONS UNIT



(57) Abstract

A system and a method are described herein which provide an originating telecommunications unit (28) with the geographic location of a mobile telecommunications unit (20) without actually placing a call to, or receiving a call from, the mobile unit (20). The originating unit (28) provides a service platform (24) with an authorization code and the telephone number, or other identification, of the mobile unit (20) to be located. The service platform (24) then initiates a location program which uses various geographic location methods to provide the originating unit (28) with the location of the mobile unit (20), without the user of the mobile unit (20) becoming aware that the location of the mobile unit (20) is being determined.

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SYSTEM AND METHOD FOR PROVIDING A GEOGRAPHIC LOCATION OF A MOBILE TELECOMMUNICATIONS UNIT

Field of the Invention

This invention relates to a system and method for providing an authorized person having a telecommunications unit with the geographic location of a mobile telecommunications unit.

5 Technical Field

Currently, to determine a mobile unit's location, the cell location of the mobile unit can be determined using known methods, but only if the mobile unit is transmitting, i.e. only if a call has been placed by or to the mobile unit. It is advantageous and desired that a user of a
10 telecommunications device, such as a wireless telephone, a land-based telephone, or a land-wired telecommunications device such as a personal computer, determine continuously in real-time the geographic position of a mobile telecommunication unit without a call actually being placed to or by the mobile unit.

15 In such a situation, the mobile unit is typically a wireless mobile telephone, but may be a computer or any other device capable of communicating via wireless protocol. For example, a parent may desire the location of his/her child by determining the location of the child's mobile phone which, hopefully, is with the child. The system and method of the
20 present invention would allow the location of the mobile unit to be determined automatically, or without requiring intervention, as long as the mobile unit is powered-on.

Summary of the Invention

This invention is for a system and method of providing an originating
25 telecommunications unit, i.e., the unit initiating the telecommunications message or telephone call, with the geographic location of a mobile telecommunications unit without a call being placed from the originating unit to the mobile unit, or vice versa. An originating telecommunications unit places a call to a special number to activate the geographic location
30 function. An authentication code is provided by the originating unit user.

The mobile unit to be located is identified by the originating unit user. The originating unit is then provided with the geographic location of the mobile unit via a recorded message from a service platform or via data transmitted to the terminal of the originating unit. The originating unit user may then
5 request a location update from the system, or may terminate the location request by hanging up.

The geographic location of the mobile unit is determined from geographic information provided to the service platform from a space-based GPS-type satellite platform, from a device performing triangulation
10 calculations, from a device which performs distance delay calculations, or from a transceiver from a mobile cell which determines the strongest signal from the mobile unit among a plurality of cells. Other suitable means may also be employed.

The invention has many uses, such as a wireless tracking device
15 utilizing a wireless mobile unit as the tracked device. As long as the mobile unit is powered-on, the geographic location of the mobile unit can be determined by any of the aforementioned methods. In this way, an originating telecommunications unit can receive information concerning the geographic location of the mobile telecommunications unit without a voice
20 connection between the mobile unit and the originating unit being made. Such a system has many real world applications, such as verifying whether the user of the mobile unit is actually at a predetermined geographic location, or in determining the geographic location of the mobile unit in a case of theft, kidnaping, etc.

25 **Brief Description of the Drawings**

FIG. 1 is a block diagram of an embodiment of this system and method of the present invention.

Brief Description of the Preferred Embodiments

FIG. 1 illustrates the system and method of the present invention.
30 The geographic location provider system 10, in general, is made up of the components shown. In operation, an originating telecommunications unit 28, typically a land-based wired or wireless telephone, or a computer, places a call to a prespecified telephone number to initiate the location provider

system 10 to determine the geographic location of a mobile telecommunications unit 20. Mobile unit 20 is typically a wireless telephone, a computer, or any other device capable of wireless telecommunications with a wireless serving switch 22. The originating unit 5 28 then provides an authorization code, or other authorization data, which is transmitted to a public switching telephone network 26 and on to a service platform 24. The originating unit 28 user also provides the telephone number, or other identification, of the mobile unit 20 to be located.

10 Receipt by the service platform 24 of the authorization code and mobile unit phone number information prompts the service platform 24 to initiate a program which attempts to geographically locate the position of the mobile unit 20 and to provide that information to originating unit 28. The originating unit 28 does not actually initiate a telecommunications 15 message, i.e. a telephone call, to the mobile unit 20 to determine the geographic location of the mobile unit 20. However, mobile unit 20 must be powered-on during the location provider process.

Service platform 24 performs a lookup in a data base which to provide the originating unit 28 with the geographic location of mobile unit 20. Service platform 24 delivers this information to originating unit 28 20 either by voice prompts, or by electronic messaging such as Short Message Service (SMS) or Cellular Digital Packet Data (CDPD) protocols.

Various devices and means may be employed to provide the geographic location of mobile unit 20 to the originating unit 28. In 25 particular, a geographic location provider device 32 provides service platform 24 directly, or indirectly through wireless serving switch 22, with the geographic location data. Location provider device 32 may be a space-based satellite platform, such as a GPS system, or any other satellite system which functions to geographically pinpoint an object on the earth 30 using various known methods. The location provider device may be located on the mobile unit 20. Alternatively, other devices which may function as the location provider device 32 are a device which performs triangulation calculations to determine the geographic location of mobile unit 20, a device

which utilizes distance delay calculations such as round-trip-delay to determine that geographic location, or a device which determines which cell among a plurality of cells is receiving the strongest signal from the mobile unit 20. Service platform 24 may also send a short message or page signal
5 to mobile unit 20 without actually placing a call to mobile unit 20. In this manner, mobile unit 20 may itself provide service platform 24 with information regarding its own geographic location or the service platform may deduce the geographic location of the mobile unit by one or more of the techniques described above.

10 Thus, the user of mobile unit 20 is unaware that the user of originating unit 28 is attempting to determine the geographic location of the mobile unit 20. Various uses should come to mind, for example, using mobile unit 20 as a tracking device for an individual, a vehicle, etc. As long as the mobile unit 20 is powered-on, its location can be automatically
15 determined after the proper authorization code and mobile unit ID information are provided by originating unit 28.

The message protocol 30 between wireless serving switch 22 and service platform 24 is typically a common telecommunications standard such as CTIA IS-41 or ITU GSM MAP. The wireless communication
20 protocol 34 between mobile unit 20 and wireless serving switch 22 may be a standard such as AMPS, TDMA/CDMA or GSM.

The foregoing disclosure and description of the invention are illustrative and explanatory of the preferred embodiments. Changes in the size, shape, materials, elements and individual components used, the
25 connections made, or other construction, may be made without departing from the spirit and scope of the inventions herein claimed.

WHAT IS CLAIMED IS:

- 1 1. A method of providing an originating telecommunications unit with
2 the geographic location of a mobile telecommunications unit, comprising the
3 steps of:
4 providing a service platform which communicates with the mobile
5 telecommunications unit through a serving switch;
6 receiving from the mobile telecommunications unit a signal from
7 which the geographic location of the mobile telecommunications unit may
8 be determined;
9 receiving from the originating telecommunications unit an
10 authorization code into the service platform; and
11 in response to receipt of the authorization code, providing to the
12 originating telecommunications unit information representing the
13 geographic location of mobile telecommunications unit.
- 1 2. The method of claim 1, wherein the geographic location is initially
2 ascertained by a geographic location provider prior to being provided to the
3 originating telecommunications unit.
- 1 3. The method of claim 1, wherein the geographic location is first
2 provided to the service platform by a geographic location provider prior to
3 the geographic information being provided to the originating
4 telecommunications unit.
- 1 4. The method of claim 2, wherein the geographic information is
2 ascertained by a space-based satellite platform.
- 1 5. The method of claim 2, wherein the geographic information is
2 ascertained by a device which performs at least one triangulation
3 calculation.

1 6. The method of claim 2, wherein the geographic information is
2 ascertained by a device which performs at least one distance delay
3 calculation.

1 7. The method of claim 1, further comprising the step of providing the
2 identification of the mobile telecommunications unit to be located.

1 8. A telecommunications system which provides a telecommunications
2 unit with the geographic location of a wireless telecommunications unit,
3 comprising a service platform capable of communication with a switch for
4 serving the wireless telecommunications unit, wherein the originating
5 telecommunications unit receives geographic information representing the
6 geographic location of the mobile telecommunications unit from the service
7 platform after the originating telecommunications unit provides an
8 authentication code to the service platform.

1 9. The system of claim 8, wherein the geographic information is
2 provided to the service platform by a geographic location provider prior to
3 the geographic information being provided to the originating
4 telecommunications unit.

1 10. The system of claim 8, wherein the originating unit provides the
2 identification of the mobile unit to be located prior to the originating unit
3 being provided information representing the geographic location of the
4 mobile telecommunications unit.

1 11. The system of claim 8, wherein the geographic information is
2 provided to the originating telecommunications unit as a voice message.

1 12. The system of claim 8, wherein the geographic information is
2 provided to the originating telecommunications unit as electronic messaging
3 information.

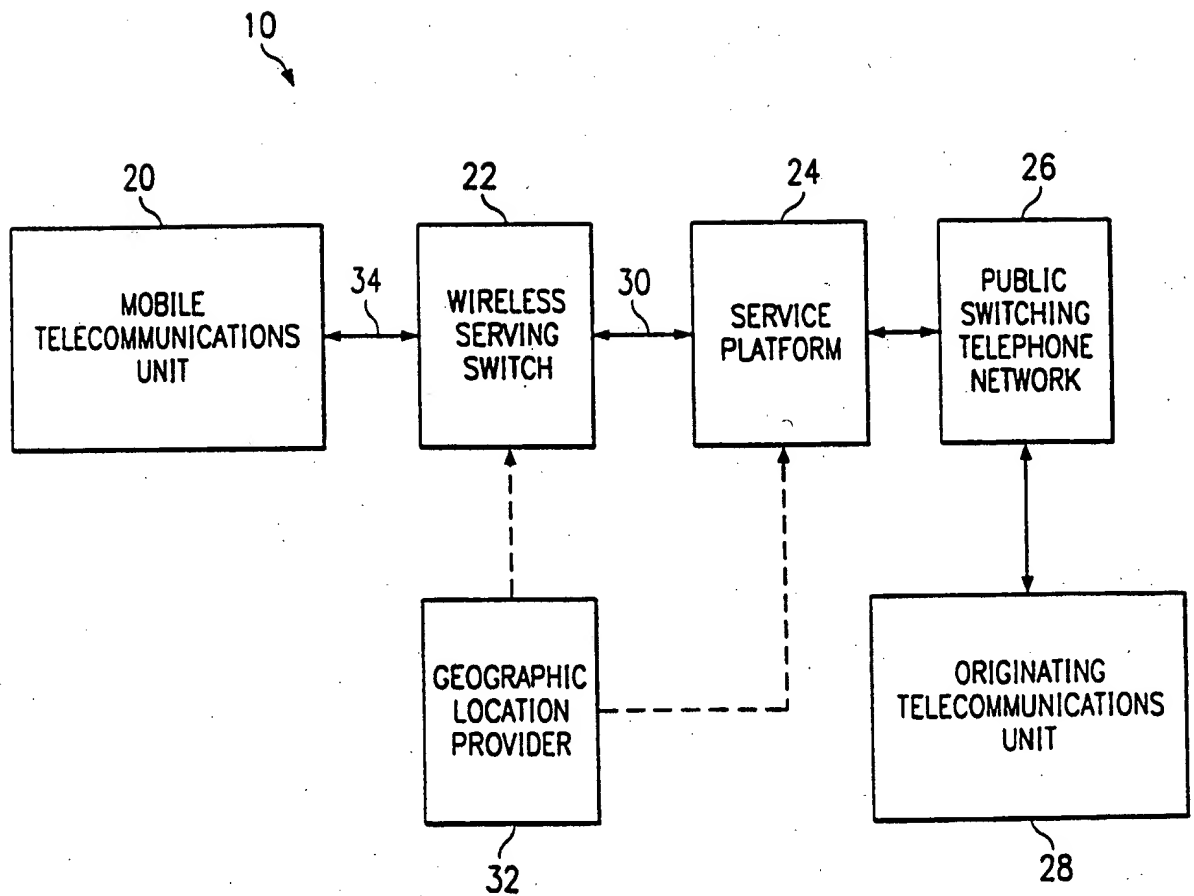
1 13. The system of claim 12, wherein the electronic messaging
2 information is formatted as short message service (SMS).

1 14 The system of claim 12, wherein the electronic messaging
2 information is formatted as cellular digital packet data (CDPD).

1 15 A service platform for providing a location of a mobile unit, the
2 platform comprising:
3 means for receiving signals from the mobile unit;
4 means for determining the location of the mobile unit from the
5 received signals;
6 in response to authorization from an external system, means for
7 providing the location to the external system.

1 16 The system of claim 15, wherein the signals are received from the
2 mobile unit automatically.

1 17 The system of claim 15, wherein the signals are received without
2 notifying a user of the mobile unit.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/11591

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : Please See Extra Sheet.

US CL : 455/456

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US 5,625,668 A (LOOMIS et al.) 29 APRIL 1997 (29.04.97) abstract, lines 5-14, column 3, lines 7-27, column 4, lines 17-31, column 6.	15-17 ---- 1-14
Y	US 5,544,225 A (KENNEDY III et al.) 06 AUGUST 1996 (06.08.96), lines 39-62, column 1, lines 5-9, column 7, lines 37-61, column 18.	1-14
Y	US 5,550,907 A (CARLSEN) 27 AUGUST 1996 (27.08.96), lines 31-39, column 4.	13-14

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Further documents are listed in the continuation of Box C.

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See patent family annex.

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A. CLASSIFICATION OF SUBJECT MATTER:

IPC (6):

G01S 5/10

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B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

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